

Case study title: Seismic Vulnerability Assessment for the Public Schools in Bogotá, Colombia

Contact(s): Name: Herbert Ramírez, Design Engineer
Organization: P&D, Proyectos y Diseños Ltda. (Projects and Designs Ltd)
Cra. 20 # 84-14 Piso 7, Bogotá, Colombia
Phone: +57 1 530 0660
Fax: +57 1 530 0650
E-mail: her812@supercabletv.net.co
URL:

Case study emphasis: Risk identification, evaluation and management. Disaster preparedness.

Summary: Offers a methodology for the vulnerability identification, evaluation and assessment of the school buildings in case of a seismic event, based upon the conditions of the school structures, including nonstructural elements, geographical location (amongst the microzonation soil map of Bogotá), usage and occupancy. Intended to provide the local administration with the necessary information to plan and stimulate efforts to reduce risk from a seismic event, as well as disaster preparedness and determination of the degree of destruction and corresponding economic impacts. The methodology leads to a management tool to define priorities and sequence of rehabilitation, when needed. In total more than one million square meters of building area were evaluated, including a total of 2555 buildings belonging to 645 public schools.

Date that model application was completed: April, 2000.

Case study geographical location: The procedure was applied to all school buildings belonging to the City of Bogota. Approximately one million square meters (10,000,000 ft²).

Vulnerability assessment indicators: Vulnerability Indices for over strength and flexibility. Hassan-Sozen Vulnerability Index.

Methodology data requirements: Detailed data collection for all buildings were implemented. This data was summarized in four types of questionnaires (physical, structural, non-structural, geotechnical). Where drawings existed they were used. Lack of information was supplemented by a more detailed data collection, including building inventory; microzonation soil map; usage and occupancy data. The information collected was complete enough to permit a structural seismic vulnerability evaluation of every school building.

Direct participants in the application of the model of the vulnerability assessment:

Economic and social sector participants directly involved: District Education Secretary

Methodology objective:

The objective was to develop and implement a methodology for evaluating seismic vulnerability of all school buildings belonging to the Secretary of Education of the City of Bogotá. This methodology leads to a management tool to define priorities and sequence of rehabilitation, when needed. In total more than one million square meters of building area were evaluated, including a total of 2555 buildings belonging to 645 schools.

Methodology output:

For each building vulnerability assessment was reported through three independent indices. Formal detailed vulnerability assessment and rehabilitation detailed design was performed to several schools in order to confirm the goodness of the methodology. Final result was a managing tool that permits assignment of priorities for deciding the order of rehabilitation and how to use limited economic resources in the best manner.

Results of methodology application at case study site:

From the methodology a policy for assignation of priorities depending on vulnerability level, number of exposed students, and available economic resources, was established for the city.

Lessons learned:

- 1) Valuable experiences were obtained in data acquisition, approximate vulnerability assessment, and formal assessment and rehabilitation design.
- 2) The study provided enough information to perform additional calibration and improvements to the methodology.
- 3) Active participation of the whole community is essential for the success of the study.